The Impact of Governmental Signals on Environmental Morale. A 'Behavioural' Approach

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Abstract

Possible ways to enhance environmental sustainability involve encouraging people to change their life-style towards more eco-conscious behaviour using information campaigns and price-based instruments. This introduces the questions of 1) how Governments should efficiently incentivise people to behave environmentally friendly (e.g. *nudging* vs mandatory policies); and, 2) how people react to different policy measures according to their underlying motivations. The purpose of this analysis is to shed light on these particular aspects of policy design and to analyze the conditions under which ethical considerations – i.e. environmental morale – matter in environmental contexts.

Keywords: intrinsic motivation, extrinsic motivation, environmental morale, crowding-in, crowding-out, recycling.

JEL Classification: C83, H30, H41

1. Introduction and background literature

The orthodox literature suggests that the success of the economic approach to human behaviour is due to the relative price effect. The relative price effect leads *homo economicus* to increase their supply of effort when facing external incentives. However, recent studies in the literature show that price-based instruments (e.g. rewards, fines, and taxes) undermine intrinsic motivation, i.e. they are counterproductive. This phenomenon is known in the literature as the 'crowding-out effect' and it is likely to occur when narrowly conceived of rationality is not the only motive in play and choices are also driven by different types of incentives, i.e. intrinsic motivation. Specifically, the psychological literature suggests that external interventions crowd-out intrinsic motivation if and only if they are perceived as controlling. By contrast, intrinsic motivation increases if incentives are perceived as acknowledging (see e.g. Deci and Ryan, 1985)[1].

Individuals' motivation is related to what people value as being worthy or useless (Eriksson and Andersson, 2010). *Homo economicus* is only a single explanation of how human beings act and what they value. The standard model of human behaviour implies that rational *homo economicus* cares only about their own consumption of public and private goods and they do not consider it to be in their 'narrow self-interest' to contribute to the provision of public goods (given that they can 'free ride' and benefit from the contribution of others). However, there is substantial evidence in the literature showing that in many situations individuals' behaviour is at odds with narrowly self-interested preferences (see for example Frey and Meier, 2004). This shows that there can be other motives and values that guide individuals' choices.

[1] For a discussion see also Frey (1997), Frey (1999), Frey and Stutzer (2006) and Nyborg (2008).

Research has suggested different theories namely 'theories of other-regarding preferences' to explain such philanthropic behaviours (Frey and Stutzer, 2006). Examples are altruism, social norms, reciprocal preferences, and internalized norms. All of these theories are important to modeling 'real life' and can play a fundamental role in human behaviour.

The relationship between external intervention and intrinsic motivation has been investigated in many different fields of study such as labour supply (e.g. voluntary work), tax evasion and public good provision (see, for example, Marwell and Ames, 1979, Frey and Oberholzer-Gee, 1997, Gneezy and Rustichini, 2000a, Gneezy and Rustichini, 2000b, Frey and Jegen, 2001, Frey and Stutzer, 2006, Nyborg, 2008). In general, these studies show that monetary incentives may undermine morale or intrinsic motivation and therefore they can be counterproductive.

Although most of the published works underline the importance of environmental morale as a way of reaching desirable goals in environmental contexts (see e.g. Frey, 1997, and Frey and Stutzer, 2006, Nyborg, 2008), there seems to be only one study that, based on an experimental survey, tries to shed light on this particular issue. The conditions under which governmental signals (i.e. policies) crowd-out/in intrinsic motivation in the form of environmental morale seem to be extremely relevant when this comes to the alternative hypothesis of leaving the care of the environment to the voluntary contribution of intrinsically motivated people. There is reason to believe, in fact, that environmental risks are evaluated less seriously with respect to negative outcomes in other domains (see Gattig and Hendrickx, 2007).

The present study seeks therefore to make a contribution to this area of research and to shed light on how people react to different policies (i.e. government signals) according to their underlying intrinsic motivations. Since the "low cost" argument (for a discussion see Frey, 1997) suggests that feasible areas of intervention can be found only in the private household sector, the purpose of this study is to consider information about people's attitudes towards recycling activities. The analysis is based on a questionnaire designed to offer insights on these particular issues.

The nature of *homo economicus*[2] has been examined both at the individual level in studies of interpersonal cooperation and tax evasion,[3] and at the cultural level in studies of tax evasion[4]. This study pursues a similar evaluation with respect to environmental policies, an area which has been neglected in the environmental economics literature. Thus a further hypothesis to be tested is whether or not there is a difference between subjects about their sensitiveness towards environmental issues.

As with other areas of research (see e.g. Frank et al., 1993, and Selten and Ockenfels, 1998, Lewis et al., 2009), at the individual level the questionnaire aims to shed light on the self-regarding and instrumental attitudes of people who study economics and those who study psychology. At the cultural level, the analysis offers a cross-country comparison between respondents in Italy and the UK. According to the latest available statistics (see European Commission, 2011), although in the past decade the recycling sector has massively increased in both the UK and Italy, the UK performed

[2] This term is also referred in the literature as Rational Economic Man (REM).
[3] For the former see Yezer et al. (1996) and Frank et al. (1998). For the latter see Lewis et al. (2009).
[4] See, e.g., Alm and Torgler (2006) and Lewis et al. (2009).

better than Italy.[5] Among other reasons, this might be due both to late (or lack of) public acceptance of separate collections, or differences in the level of environmental morale as well as their trust in governments. Therefore, the present analysis tries to assess: 1) whether Italians and British students respond in different ways to different policy measures according to their level of environmental morale (e.g. Are Italians (economists) less willing to contribute to recycling activities at a voluntary basis?); and 2) whether these differences can be explained by individual characteristics (e.g. gender, financial satisfaction, degree studied, occupation, marital status and level of education).

This study provides a first attempt to analyze the determinants of environmental morale using a broader definition, which embodies both intrinsic and extrinsic motivations. Results confirm this hypothesis of multi causation.

The paper is organized as follows. The next section discusses the definition of environmental morale. Section 3 presents the methodology and description of questionnaire used to analyze the determinants of environmental morale and individuals' reaction to different policy measures. This is followed by the discussion of results. The paper concludes with overall remarks and possible policy implications stemming from empirical results in Section 5.

2. Environmental morale and its definition

Despite the difficulty in disentangling different factors underlying individuals' behaviour in social dilemmas, it is generally agreed in the literature that environmental morale is the result of the aggregation of internalized norms and intrinsic motivation (Frey, 1997, Frey and Stutzer, 2006). Internalized norms can be considered as moral obligations that come from a cognitive process – i.e., an external regulation that becomes an autonomous regulation (see also Coleman, 1994). Intrinsic motivation represents instead 'the doing of an activity for its inherent satisfactions rather than for some separable outcomes' (Ryan and Deci, 2000a, p.56) – i.e. extrinsic motivation. However, as suggested by Fehr and Stutzer (2006), the distinction between the two terms becomes subtle especially when norms have been internalized. If a non-intrinsically motivated behavior (i.e. obeying a social norm) becomes an internalized value, individuals feel a sense of obligation to that norm, and acting against this moral responsibility results in negative feelings (i.e. feelings of guilt and frustration, reduced self-esteem, and other negative self-evaluation). In addition, although the literature acknowledges the importance of many other factors that influence environmental morale, it is not clear to what extent intrinsic motivation can be influenced by extrinsic motivation (see also Frey and Stutzer, 2006).

In order to address these aspects, the present study proposes a broader and novel definition of environmental morale which comprising attitudes and beliefs towards the environment driven by ethical considerations (e.g. it is wrong not to behave according to eco-conscious considerations). As an analogy with the tax evasion literature (Torgler, 2005, p. 526), environmental morale will be defined as the intrinsic

[5] Some 24.3 per cent of total waste generated in the UK was recycled in 2009, against 12.4 per cent recycled in Italy.

motivation (or behavioural motive) to contribute to a better environment. That is, environmental morale represents individuals' willingness or moral obligation to behave in an environmentally conscious way, or their belief in contributing to society by showing pro-environmental behaviours. Likewise, tax morale includes feelings of moral regret or guilt over cheating on taxes, so environmental morale might involve individuals' oppressiveness (i.e. negative feelings) as a deterrent to free riding. The greater such oppressiveness, the more individuals will be driven towards more sustainable behaviours. Thus, it might be expected that those with higher environmental morale will be more willing to prevent environmental degradation and 'abuses'. By contrast, those who exhibit low environmental morale would be less willing to be actively involved in protecting the environment.

Based on this definition, it is evident that environmental morale is not only the act of doing an action for its intrinsic satisfaction, but it can also be described as a moral obligation. The question is what influences such a moral obligation? Could extrinsic forces also play a certain role?

Crowding-out theory interferes with the *level* (i.e. the amount) of motivation by enhancing or reducing it according to the interaction between external interventions and internal motivation (Ryan and Deci, 2000a). This involves the specification of particular forces that undermine intrinsically motivated behaviour. From a psychological perspective, external interventions affect individuals' self-determination and self-esteem via a reduction of the perceived level of competence and autonomy in performing a task. An economic perspective would be different in that a reduction in motivation has to be found in the failure of the relative price effect, which leads the crowding-out effect to prevail.

The *orientation* of motivation is related to the reasons why actions take place (Ryan and Deci, 2000a, 2000b). The economic perspective suggests that individuals as *homo economicus* tend to behave instrumentally to maximize their own utility. In other words, they behave with the expectation of obtaining other material outcomes from the action. The psychological perspective suggests distinguishing between intrinsically and extrinsically motivated behaviours (see e.g. Ryan and Deci, 2000a, 2000b). Intrinsically motivated behaviours associate individuals' satisfaction to feelings of competence and autonomy in performing the activity. Extrinsically motivated behaviours link individuals' behaviour to separable outcomes that come from outside the individuals themselves. To summarize, intrinsic motivation is something more inherent to the internal sphere of the individual, while extrinsic motivation regards external factors (e.g. material gains) able to influence individuals' motivation. The taxonomy outlined lets us conclude that e.g. feelings of altruism, reciprocity[6] and internalized norms fall into the category of intrinsically motivated behaviour, whilst social norms feed into extrinsically motivated behaviours. While social norms are not directly related to external material gains, in fact, individuals'

[6] From here on, the term refers to the idea of *strong* reciprocity (see e.g. Bowles and Gintis, 1998, 2004). In contrast to *weak* reciprocity (also known as *tit-for-tat* behaviour), *strong* reciprocity implies either some form of cooperation with others similarly disposed or some form of retaliation towards those who disregard cooperative behaviour, even if both rewarding and punishing are personally costly and if individuals are not expecting to receive personal gains in the future (see also Gintis, 2000, Bowles and Gintis, 2000). For these reasons, reciprocal behaviour differs deeply from 'cooperation' and 'retaliation' in repeated interaction since they are principally motivated by future material benefits.

performance depends on extrinsic factors, i.e. social pressure (see also Ryan and Deci, 2000a). But, what shapes environmental morale?

On the one hand, it can be argued that intrinsically motivated people with altruistic and reciprocal preferences certainly play an important role (see Figure 1 below). Altruists voluntarily will contribute to the provision of environmental goods not only because of their 'warm glow' of giving (see Andreoni, 1989, 1990)[7], but also for the sake of others well-being. According to Frey and Stutzer (2006), the limits of governmental interventions in specific situations (e.g. monitoring those who litter the streets with cigarettes or paper) reveal the importance of intrinsically motivated behaviour. It is particularly in these cases that environmental morale can be strengthened by altruistic preferences.

Reciprocal preferences can be also of crucial importance for the support and enforcement of social norms and external regulations (see e.g. Nyborg, 2008). Indeed, they can be interpreted as a norm enforcement device. This is particularly so in the case of *strong and liking (i.e. gift-induced)* reciprocity.[8] This form of reciprocity suggest that, when a sufficient proportion of the population breaks a commonly shared social norm, and those who perceive this action as hostile are willing to punish (even at their own costs) the rule-breakers, then the persistence of the norm can be guaranteed. Therefore if individuals perceive the preservation of the environment as a (social) norm, reciprocity can boost pro-environmental behaviour. Reciprocity preferences also assume relevance when considering the interaction between external intervention and internal motivation. *Positive* and *comparative (or balance)* reciprocity[9] certainly suggest that if people perceive an environmental regulation as fair they will respond in kind given their sense of gratitude or oppressiveness towards the initial 'giver' (i.e. the government of the institution that has introduced the policy). Vice versa, they will fail to be compliant when the regulation is considered unfair (i.e. negative reciprocity), thus reducing their intrinsic motivation. The introduction or the expansion of kerb-side collection, for example, might induce individuals to be more involved in recycling activities. In a way it nudges people's behaviour towards the desirable outcome.[10]

On the other hand, social norms might also influence individuals' behavior and attitudes towards the environment (see e.g. Torgler et al., 2009)[11]. In general, social norms can be viewed as valuable beliefs about how one ought to act (see also Frey and Stutzer, 2006) according to what is socially acceptable/unacceptable or approved/disapproved (i.e. avoiding littering the streets, maintaining the quality of public parks), so that punishments for not complying come from the society itself (i.e.

[7] The 'warm glow' of giving is a 'selfish motive' embodied in the definition of 'impure altruism' coined by Andreoni (1989, 1990). Impure altruism assumes individuals contribute to the public good not only because they take into consideration the others well-being, but also because they experience some additional benefits 'from having done their own bit' (Andreoni, 1989, p. 1448).

[8] For a discussion see Kolm (2008) and Fehr and Schmidt (2006).

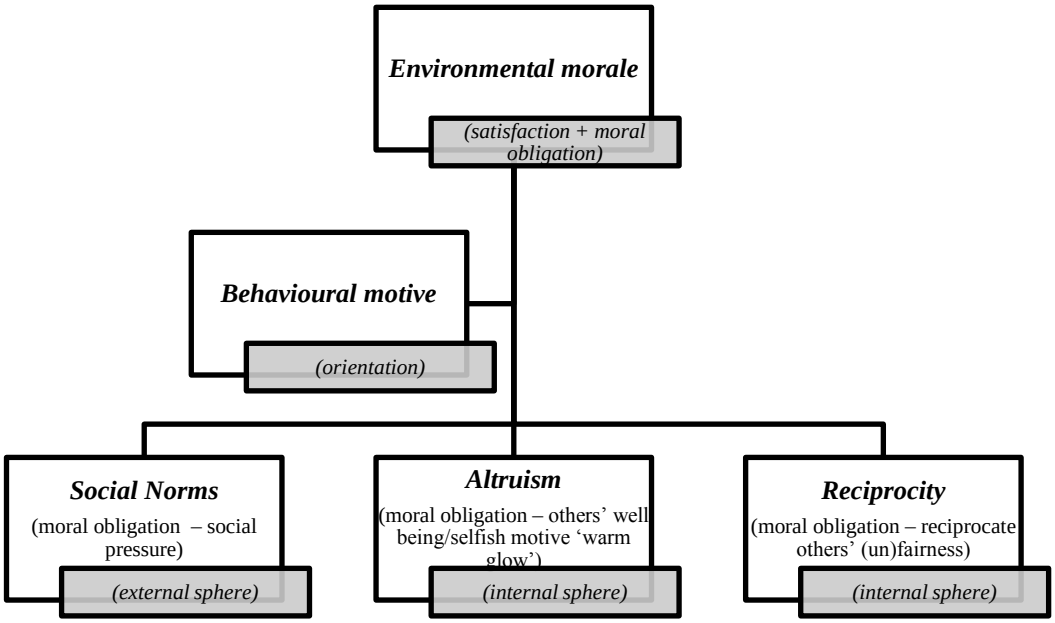
[9] For a definition of *positive/negative* reciprocity see Gouldner (1960), and Fehr and Gächter (1998). For *comparative (or balance)* reciprocity see Kolm (2008).

[10] However, given that economic incentives here are altered, this cannot be considered as a 'pure' *nudging* situation. For a detailed analysis of the concept of nudge see Thaler and Sustein (2008).

[11] Torgler et al. (2009, p.8) also seem to allude to a broader definition of environmental morale as they define it (i.e. individuals' willingness to avoid littering the street) as 'a particular case of environmental morale'.

social pressure, namely the extrinsic motivation). Peer pressure may arise feelings of guilt or shame across members' group. Therefore moral obligations towards the environment may apply even when people do not feel intrinsically motivated (i.e. they do not receive satisfaction) to observe the 'norm'. This is, for example, what distinguishes social norms from internalized norms. Internalized norms can be considered as moral obligations that come from a cognitive process – i.e., an external regulation that becomes an autonomous regulation (see also Coleman, 1994). The introduction of kerbside collection, for example, can advise citizens about the importance of recycling, thus increasing their awareness about the problem and consequently their performance. However, in this case, the nature of sanctions for not complying may only be the consequence of negative self-evaluations, which come from the inside of the individual. Furthermore, in contrast with social norms, an internalized norm can ensure that, when removing the regulation, behaviours will not be reversed. What was previously imposed by regulation is now, in fact, considered as a 'standard'.

Figure 1: Environmental morale and other regarding theories



3. Methodology and description of the questionnaire

3.1 Procedure

The empirical analysis is based on a questionnaire survey conducted in the cities of Bath (United Kingdom) and Florence (Italy). Before proceeding with the collection of the questionnaires two pilot analyses were carried out. After introducing the necessary changes a final version of the questionnaire was developed according to respondents' suggestions and field-experts' opinions.

The survey was administered by the author during the period October-December 2011. The questionnaires were collected from Psychology and Economics lectures in

the University of Bath and from Economics lectures in the University of Florence according to the following procedure. After a brief introduction to the study, participants received a printed version of the questionnaire.

Participants were then asked to complete the questionnaire on their own and without consulting their colleagues. The time taken to hand out the questionnaires; to complete and collect them again was approximately 20 minutes. In all 980 responses were collected.[12] Data from 25 participants were excluded. Among them, 5 did not complete the questionnaire, 8 answered all questions without following the instructions provided in the answers (next to each option), and the remaining 7 provided answers that were not consistent with the structure of the questionnaire (e.g. they answered question Q3.b after choosing 'I would increase my effort' in question Q3). After omitting these data, the full sample is based on 955 observations: 377 constitute the Italian-economists subsample, 325 comprise the British-economists subsample, and the remaining 253 represent the British-psychologists subsample. The questionnaire is reproduced as Appendix A.

3.2 Dependent variables

Answers to three hypothetical scenarios were aggregated into scale that served as dependent variables. The first setting (hereafter VOLUNTARY scenario) considers a situation where individuals have to bear the time and trouble costs of recycling activities (e.g. separate their waste and/or buy different bins and garbage bags for specific waste). Given this assumption, respondents were asked to assess their level of contribution in terms of effort spent on recycling activities. Responses were based on a five-point Likert scale (from 'very high' to 'I will do hardly any recycling').

In order to understand which reason was the most important for their decision, two follow-up questions were also asked. The alternatives provided in the answer were based on the most common factors mentioned in the literature as possible explanations for pro-environmental behaviours (see DEFRA, 2002, and Barr, 2003). In particular, the present analysis considers: *awareness* (i.e. 'I believe environmental damages caused by not recycling are significant/insignificant'); *appropriate information-campaigns* (i.e. 'I am/I am not well informed about waste recycling collection); *social pressure* (i.e. 'I participate in recycling activities because others do so'), that is the acceptance of the norm to recycle given that others do participate in such activity.

In addition to these factors, respondents were provided with an open question (i.e. 'Other reasons') in order to answer in their own terms and to locate other factors influencing voluntary contribution to recycling activities. The VOLUNTARY scenario represents a benchmark situation and it was designed in order to facilitate

[12] Among them, 389 questionnaires were collected in Italy (University of Florence) from economics lectures; while of the remaining 591 questionnaires collected in UK (University of Bath), 334 were taken from economics lectures, and 257 were gathered from psychology lectures.

comparisons with two other scenarios where individuals' behaviour was designed to be driven by external incentives enforced by a local authority.[13]

The second scenario (hereafter the BIN scenario), in fact, considers improving the provision of recycling materials and services without charging any fees. In addition to these improvements, the third framework (hereafter FINE scenario) introduces a money fine on those who are caught not recycling as requested. The fine here serves as a *vehicle* (see Gneeze and Rustichini, 2000b, and Bruvoll et al. 2002) to avoid responsibility costs (i.e. time and trouble costs) contingent on recycling activities, rather than just a punishment for not recycling as requested.

In both scenarios respondents were presented with a question where they were asked to compare the new situations with that presented in the first setting. Thus, they were required to think about whether the changes provided by the new scenarios would affect their behaviour in some way. The assumption here is that individuals may react in different ways to different policies (i.e. signals). In particular, external interventions may either reduce/increase individuals' motivation and effort or not influence individuals' behaviours at all. Possible responses to these questions were: 'I would exert the same level of effort', 'I would increase my effort', and 'I would decrease my effort'.

Furthermore, in order to provide possible explanations for respondents' decisions and to capture the reasons for the crowding-out/in effect, two follow-up questions for the 'I would increase my effort' and 'I would decrease my effort' options were used.[14] There were four different alternatives for each follow-up question (see Table 1). For those who chose 'I would increase my effort', the follow-up options were based on a combination of the disciplining effect motivation (Frey, 1997)[15]/crowding-in motivation (Frey, 1997), and a social pressure explanation. For those who chose 'I would decrease my effort' possible follow-up alternatives were given by a combination of two crowding-out effect motivations (Andreoni, 1989/Frey, 1997), and a social pressure choice. A general open answer (i.e. 'Other reasons') where respondents were allowed to write their personal opinions about these issues was also provided in the questionnaire.

[Insert Table 1 about here]

The crowding-out motivations were formulated as follows. As the literature suggests, it is possible to distinguish between two types of crowding-out effect: one assumes

[13] Given that the same reasons may apply for a medium provision of effort, those who chose this option in question Q1, were asked to select one option among the possible alternatives presented in the follow-up questions related to high and low provision of effort (i.e. Q1.a and Q1.b).

[14] Since the study mainly focuses on the crowding-out/in effect, no follow-up question was built for the answer 'I would exert the same level of effort', where individuals are indifferent to policy changes. Possible explanations for this could be either that they are already providing their maximum level of effort or they do not exhibit any form of initial motivation.

[15] According to Frey (1997, 1999) a disciplining effect occurs when external interventions raise agents' performance either increasing marginal shirking costs or, equivalently, decreasing marginal costs of performing (e.g. using a fine). *Ceteris paribus*, if individuals are profit maximizers and the external intervention does not influence the marginal benefits of performance, the relative price effect predicts that the intervention raises performance. In this case, the crowding-out effect is neglected because intrinsic motivation is considered to be a constant or, alternatively, absent.

that 'instrumental' considerations play a major role in determining how individuals perform after a government 'signal' has been sent (see Andreoni, 1989); the other one is more related to intrinsic motivations (see Frey, 1997) and to the extent to which external regulations affects performance *via* self-determination and self-esteem.[16]

Given this, the study has the advantage of being able to distinguish between environmentally conscious behaviour induced by instrumental evaluations (i.e. disciplining and Andreoni's crowding-out effect) from those induced by 'ethical' considerations (Frey's crowding-in effect).

In the BIN scenario, for example, Frey's crowding-in effect would predict that those who perceive the improvement of recycling materials and services as a fair and acknowledging policy will enjoy increasing their contribution (especially when people exhibit positive reciprocal preferences). People, for example, can feel gratification from responding in kind. Likewise, it is more likely that 'intrinsically motivated' people (rather than the 'non-intrinsically motivated') will positively react to an increase of the range of material collected by increasing their effort to improve recycling. Nevertheless, people may perceive the policy improvement as a way to control their behaviour. The quality improvement might impose a moral obligation not only on those who are not recycling, but also on those who are already carrying out the activity of recycling, thus generating a reduction of self-determination and self-esteem, i.e. Frey's crowding-out effect. The provision (and/or improvement) of recycling materials and services has also an additional effect, that is it can reduce the marginal costs of the activity. In this situation, it is reasonable to expect that respondents (and in particular *homo economicus*) will react either by increasing their provision of effort (i.e. *disciplining* effect), or by decreasing effort due to a reduction of the marginal benefits of maintaining the same level of effort – i.e., Andreoni's crowding-out effect. Individuals, in fact, may conclude that it is not worthwhile to provide the same level of effort as e.g. they can achieve the same quantity of recycling as before with less effort (i.e. they feel no need to maintain the same level of effort).

Similarly in the FINE scenario, Frey's crowding-in/out effect can occur respectively if the introduction of a 'charge' increases intrinsic motivation of conditional co-operators who no longer feel exploited by free riders (as suggested by Nyborg, 2008), or when the fine is perceived as controlling (i.e. by imposing a legal obligation on individuals). On the other hand, the penalty might raise performance by imposing higher marginal costs on shirking (i.e. *disciplining* effect), or, alternatively, it might lower performance (i.e. Andreoni's crowding-out effect) as individuals might prefer to pay someone else to do their recycling rather than bearing the time and trouble costs contingent on recycling activities themselves (see for example Bruvoll et al., 2002).

3.3 Independent variables

The details of socio-demographic/economic and attitudinal variables used in the regression analysis are given in Table 2. The table also provides their expected signs

[16] Hereafter, respectively, the Andreoni's crowding-out effect and the Frey's crowding-out effect.

and a list of earlier studies using most of the socio-demographic/economic variables included in this analysis to test attitudes towards pro-environmental behaviour (i.e. gender, age, marital status, occupation, financial satisfaction). Heterogeneity of individuals' behaviour, however, can also be due to different chosen subjects of study (i.e. psychology vs. economics) and cultures. Four different dummy variables seek to capture these aspects (i.e. Italian, British, psychologists/economists, and European).

[Insert Table 2 about here]

Furthermore, the analysis has the advantage of including some attitudinal variables that have been neglected in previous studies in this area of research – i.e., risk aversion, importance of religion, trust in government, altruism, and social responsibility.[17] There is reason to believe, in fact, that all of these variables play a role in determining individuals' attitudes towards the environment. Previous studies in different areas of research suggest that risk aversion and the importance of religion affect some aspects of individuals' morale (see Torgler, 2006, Torgler at al., 2008, 2009). The variables 'trust in government', 'altruism' and 'social responsibility' (multi item index)[18] were used instead as proxies to test the hypothesis underlying the theoretical framework – i.e., environmental morale (as well as the voluntary contribution to recycling) is influenced by feelings of altruism, need to conform to norms and reciprocal preferences. Trust in waste disposal authorities might increase cooperation as 'most people build *trust* in and *networks* to others and come to *cooperate* with them' (Paldam, 2000, p. 629). However, this may not necessarily be related to the desire of obtaining other material gains. According to Job (2005, p. 4), in fact, the foundation of trust in government derives both from rational (or calculative) and relational (or moralistic) trust, which is based 'on belief or faith in the goodness of others…which may be then projected onto political institutions'. This is what drives *continuation* (and *strong*) reciprocity that assumes that one's action is influenced by one's beliefs regarding the other player's generosity (or unkindness), irrespective of actual behaviours. Furthermore, confidence in government seems to be a crucial factor when it comes to seeing how people react to variation of policy measures. The variable 'altruism' seeks to capture the subjective importance of helping other people, i.e. the *warm glow* of giving.[19] Finally, responsibility ascriptions may influence individuals' behaviour via their self-image. Therefore when people are not sure about the right thing to do they follow others' behaviour (see Brekke et al., 2007).

[17] Most of these questions were taken from the World Value Survey (WVS) (2012). However, in this survey the Likert scale has been modified and reduced (or increased) to a five point Likert scale. This allows for consistency in the questionnaire and for the identification of a clear mid-point category.

[18] Respondents were required to state their opinions about justifiability of: cheating on taxes, throwing away litter in a public place, avoiding a fare on public transport, smoking in public place. The questions were chosen among those present in the 'justifiability section' of the WVS, which were more related to public injuries. Thus, after rescaling all answer-items according to a common five-point Likert scale (where 5 = never justified, and 1 = always justified), mean values were used in order to form index measurements. See Torgler and Schneider (2007), and Kirchler (1997, 1999) for similar approaches.

[19] The variables 'trust in government' and 'altruism' are derived respectively from Q12 and Q13 of the questionnaire.

Ethics (or environmental morale) was inferred using two different sets of questions (index-items) regarding environmentally friendly attitudes towards the environment.[20] This helps to infer individuals' intrinsic motivation and/or moral obligation to contribute to environmental protection from a broader set of activities. The index-items comprises: a question about individuals' willingness to buy a 'green' product rather than a conventional identical good for which the price difference will help to protect the environment, and a question where individuals were asked to indicate how often they take specific actions (such as save water, recycle, turn off lights, and walk, cycle or take public transport)[21] for environmental reasons. In particular, the first question tries to infer individuals' willingness to provide a monetary contribution to environmental protection (i.e. a more explicit opportunity cost), whilst the second set of questions tries to capture their willingness to bear the time and trouble costs of environmental preservation (i.e. a more implicit opportunity cost). Monetary contributions in the first question ranged between a minimum of 'zero' (i.e. only the same price as the conventional good) to a maximum of 'more than 30 per cent' (i.e. more than 30 per cent than the price of the conventional good). Each item in the second set of questions used a five-point Likert scale from 1 (never) to 5 (always). Therefore, a viable comparison between within-answer items can be constructed by assuming that those who were both willing to give a high monetary contribution (i.e. more than 30 per cent), and to provide 'always' pro-environmental behaviours exhibited very high environmental morale. Thus, after rescaling all answer-items according to a common five-point Likert scale (where 5 = very high environmental morale, and 1 = very low environmental morale), mean values were used in order to form index measurements.

The impact of socio-demographic/economic, attitudinal variables and ethics on recycling activities was analysed using ordered probit and multinomial logit. The following relationship is estimated:

$$dep_i = \beta_0 + \beta_1 sociodem_i + \beta_2 attitudes_i + \beta_3 ethics_i + \varepsilon_i , \quad (1)$$

where dep_i represents the dependent variables (i.e. VOLUNTARY, BIN and FINE scenarios) described in Table 2.

4. Empirical results

4.1 Description of the data

The responses to the different scenarios along with the reasons for participating in recycling activities are reported in Table 3. As can be seen from the table, in general attitudes seem to be friendly to recycling activities given that the majority of respondents (i.e. 80 per cent) declare they would voluntarily be willing to provide effort for recycling at least at a medium level. However, there is still a reasonable

[20] Previous research has also developed measures of pro-environmental self-identity using a similar approach (e.g. Whitmarsh and O'Neill, 2010).

[21] These actions are generally considered the most common "green" activities, i.e. water conservation, energy conservation, recycling, and traffic reduction (Whitmarsh and O'Neill, 2010).

fraction of respondents that seem to be reluctant to recycle when this has to be done on a voluntary basis (i.e. 20 per cent)[22].

[Insert Table 3 about here]

According to Table 3 awareness is a crucial factor for individuals' contribution to recycling with 71 per cent of respondents stating that they would provide effort because they believe environmental damages caused by not recycling are significant. This seems to be in line with previous results obtained from survey analyses (e.g. Barr, 2003). By contrast the lack of information plays a major role for those who would contribute at a medium or low level (i.e. 56 and 30 per cent of respondents, respectively). It is interesting to note that in this context a large body of respondents chose the option "other reasons". Although part of the respondents declare that they do not care at all about recycling activities and/or they are not contributing to recycling because of their laziness (25 per cent), the majority of individuals state they would exert a low (or medium) level of effort because of the time and trouble costs of recycling (57 per cent). This provides further evidence for the conclusion that recycling represents a social costs and strengthens the idea that such costs should be taken into account in cost-benefit analyses of different policy measures (see for example, Bruvoll et al., 2002, Berglund, 2006, and Nyborg, 2008).

In the BIN scenario instrumental behaviour seems to be predominant (see Table 3) since the majority of responses are located in the disciplining effect (62 per cent) and in Andreoni's crowding-out effect (67 per cent) categories. However, data show that there is also evidence of a motivational crowding-out/in effect where the decision of reducing/increasing recycling activities depends on ethical considerations rather than on the net benefits of changing/maintaining the same level of effort provided in the VOLUNTARY scenario. In particular, the quality improvement lead respondents with *positive* reciprocal preferences (36 per cent) to respond in kind to 'signals', while 33 per cent of respondents seem to perceive the external intervention as *controlling* (i.e. by imposing a moral obligation on recyclers) and state they would reduce their provision of effort with the policy, via a reduction of self-determination and self-esteem (as suggested by Frey, 1997).

In the FINE scenario there is evidence of both a disciplining and a crowding-out effect, working in an opposite direction (see Table 3). According to previous survey analyses (see Torgler et al., 2009, and Feldman and Perez, forthcoming), results show that a reasonable proportion of respondents (17 per cent) exhibit *strong* reciprocal preference thus confirming the hypothesis that external interventions may crowd-in intrinsic motivation of conditional cooperators. In addition, it is interesting to note that among those individuals that state they would decrease their effort because of the introduction of a fine the Frey's crowding-out effect (78 per cent) is predominant with respect to the Andreoni's crowding-out (22 per cent). Therefore, given that the crowding-in effect of intrinsic motivation is stronger in the BIN scenario than in the FINE scenario and the crowding-out effect of intrinsic motivation dominates in the FINE scenario with respect to the BIN scenario, it might be argued that respondents

[22] According to Table 3, 681 and 86 respondents were at least willing to provide a 'medium' level of effort, while 188 declared they were willing to provide low level of effort.

perceived the facilitating *nudge* policy measure as more desirable than a mandatory scheme (as suggested also by Feldman and Perez, forthcoming).

4.2. Regression results and discussion

Before proceeding with the discussion of the results two issues are worth emphasizing when focussing on the validity of the data. First, in order to circumvent cognitive problems (see for example Torgler et al., 2009) related to manipulations in ordering questions or changing the wording scale, the correlation between two similar questions asked at the beginning and at the end of the survey has been explored. In particular, the answers provided in the VOLUNTARY scenario (VOL) were compared to those provided in Q.17 part b) where respondents were required to state their actual behaviour towards recycling activities (REC). The correlation between the VOL and the REC is 0.408 ($p<0.01$). The fact that the variables are highly correlated although the order of responses was reversed seems to reduce problems related to *framing biases*. Note that the survey has been conducted in a controlled environment, which might help to guarantee that subjects paid attention to the whole list of alternative responses.

Second, the survey seems not to suffer in terms of problems related to 'socially acceptable' answers as the majority of respondents did not provide the more 'socially correct' answer both in the VOLUNTARY scenario (i.e. 'high' and 'very high' provision of effort), and in Q.17 part b) (i.e. 'I always recycle'). Alternatively responses with the highest frequency in both scenarios were respectively 'I would contribute at a medium level' (40.73 percentage of respondents) and 'I recycle often' (42.72 percentage of respondents).

This said, regression results for the VOLUNTARY scenario are reported in Table 4. The table shows three groups of estimation results. The first regression considers only the impact of socio-economic/demographic variables. It is followed by a second regression including attitudinal variables. Finally, in addition to the socio-economic and attitudinal variables, the model introduces into the regression analysis the index of environmental morale as defined before. This allows greater insight regarding the impact of each variable on the dependent variable as most of the covariates might also play a role in explaining different levels of environmental morale. Table 5 reports an ordinary least squares (OLS) regression to investigate the direction of this relationship. In addition, since when using ordered probit regression estimated coefficients can be interpreted only in terms of their sign and significance level, to measure the quantitative effect of the independent variables on the ranking information of the dependent variable, marginal effects have also been included in Table 4. For simplicity, marginal effects are presented only for the highest score of the willingness to voluntarily contribute to recycling (i.e. for the answer "very high" to the VOLUNTARY scenario).

[Insert Tables 4 and 5 about here]

Among the socio-economic/demographic variables (see Table 4 regression 1) there is strong evidence of gender and age differences. Regarding gender, results suggest that females are more willing to contribute to recycling than males by 2.8 percentage points. This result seems to contradict that reached by Barr (2003) in his survey where females played a major role for waste reduction rather than recycling activities and seems to support the literature on pro-environmental behaviours that shows that eco-conscious behaviours and attitudes towards the environment are more common in females than males. According to previous analyses (see for example Torgler and García-Valiñas, 2007) the willingness to contribute shows an inverted U-shaped relationship with age, meaning that older people are less willing than younger ones to voluntary contribute to recycling activities. In particular, contribution gradually decreases when age reaches just the second category (i.e. 25-34 years).[23] It is interesting to note that the results remain robust when attitudinal variables are introduced into the regression analysis and when controlling for risk attitudes. Thus, results show: a stronger negative impact of age (i.e. the estimated coefficient for age squared becomes more negative) as older people are supposed to be more risk averse than younger ones; and a smaller difference between sexes as according to Dupont (2004) women are generally more concerned with the risks associated with a poor quality environment.

According to previous analyses (see for example Torgler and García-Valiñas, 2007), there is no evidence of significant differences between respondents who are not married compared to those who are (or have been) married, and between respondents' employment situations in their level of contribution to recycling activities. The variables 'financial satisfaction' (see also Do Valle et al., 2004, and Whitmarsh and O'Neill, 2010) and 'religion' seem also not to play a role on the willingness to voluntarily contribute to recycling. However, results suggest a significant difference between Europeans living in the UK and all other respondents. In particular, according to this survey, Europeans living in the UK seem to be less compliant than people from other nationalities. There is an insignificant difference between psychologists and economists and, in contrast with predictions, being a psychologist rather than an economist does not affect the willingness to contribute to recycling activities. As for gender and age, results remain robust after controlling for the attitudinal variables (i.e. regression2) and for environmental morale (i.e. regression3).

Considering the attitudinal variables, results show that risk aversion, social responsibility and altruism positively and significantly affect the willingness to contribute to recycling activities. As noted above, this study has the advantage of controlling for risk attitudes. This aspect has been neglected in previous studies on individuals' preferences towards the environment (see for example Torgler and García-Valiñas, 2007, and Torgler et al., 2009). As shown in previous analyses in other contexts (e.g. the tax evasion literature) risk averse people seem to be more compliant with risk aversion increasing the probability of subjects reporting the highest willingness to contribute between 1.7 and 1.9 percentage points.

It is interesting to note that when the index of environmental morale (regression 3) is introduced into the regression analysis most of the attitudinal variables become less

[23] In order to analyze the impact of age, marital status, occupation and nationality, a number of dummy variables were also used. However, none of them were statistically significant.

robust in terms of their size and significance level. This is particularly the case of the variables 'social responsibility' and 'altruism'. A possible explanation for this is that these variables (in addition to the socio-economic/demographic variables) might play an important role in determining individuals' environmental morale. Thus, given that environmental morale represents the most dominant regressor the effect of these variables seems to be partially captured by the coefficient of the variable environmental morale with all the other regressors becoming less robust. This result supports the hypothesis that environmental morale can be driven by social norms and altruism. However, there is no evidence of relational trust in government as a possible explanation for voluntary contribution.

In order to analyse the impact of socio-economic and attitudinal variables on environmental morale, Table 5 reports OLS regression results with environmental morale as the dependent variable. In general, results shown in Table 5 follow the same pattern of those presented in Table 4 in terms of the signs and significance levels of the estimated coefficients (although they differ in their relative magnitude), thus suggesting a strong relationship between environmental morale and the willingness to contribute to recycling activities.

Among the socio-economic/demographic variables there is evidence of significant differences between the levels of environmental morale of those who are not married and those who are (or have been) married with never married people showing higher environmental morale than others. This result seems to be in contrast with findings of Torgler et al. (2009), where the authors conclude that in general married people are more compliant and exhibit high environmental morale compared to single. However, given the lack of variation in all other marital status categories, it might be argued that results in this case can be biased by the sample characteristics and should therefore be interpreted with caution.

Table 5 (regression 2) provides also evidence for a negative relationship between financial satisfaction and environmental morale. According to previous findings (see for example Torgler et al., 2009) there seems to be a non-linear relationship between the two variables and respondents seem to exhibit higher environmental morale for lower level of financial satisfaction. It is also interesting to note that this relationship becomes significant and stronger in size only when attitudinal variables are introduced into the regression. A possible explanation for this can be that depending on risk preferences individuals with higher financial satisfaction (and therefore higher income) might be more willing to pay for environmental protection rather than bearing the time and trouble costs of eco-conscious behaviours, showing therefore lower environmental morale. On the other hand, people with higher financial dissatisfaction (and therefore lower income) might be more reluctant to take risks related to environmental degradation because of high marginal utility loss (in terms of health reduction), thus showing higher environmental morale and concern. This argument is in line with prospect theory that states that people evaluate utility gains and losses relative to a reference point (see for example Kahneman and Tversky, 1979). Individuals might compare their actual situation (reference point) with hypothetical less attractive scenario where no one takes any positive action towards the environment and evaluate losses and gains of doing so in their social environment. This conclusion does not contradict the existence of an environmental Kuznets curve

given that factors that affect the willingness to contribute to environmental protection might not necessarily be related to factors affecting environmental morale and *vice versa*.

Results provide also evidence of a negative relationship between religion and environmental morale. In particular, Table 5 shows that as the importance of religion increases, the level of environmental morale decreases by 0.038 (at the 5% significance level). The question included in the survey served as a proxy for "religious identity salience" (see Torgler, 2007, p.118). In contrast with predictions, results seem to contradict the long-held belief in the literature that religious people tend to be more compliant and charitable. Therefore, it is possible to conclude that internalized religious convictions do not lead either to higher environmental morale or to an increase of voluntary contribution to recycling. A possible explanation for this is that respondents who declare religion is very important in their life do not have internalized religious values and, as suggested by Malhotra (2011), they might be more likely than non-religious individuals to behave pro-socially only when they attend their place of worship. In other words, they might be subject to the *Sunday effect*. On the other hand, it is also possible that there can be other non-God related stimuli that lead non-religious individuals to exhibit higher environmental morale and to behave eco-consciously (see Shariff and Norenzayan, 2007, and Malhotra, 2011). However, this remains a question of future research since the methodology employed in this study cannot disentangle the different reasons that guide non-religious individuals to be more environmentally friendly. Note that the negative relationship between environmental morale and religion is strengthened when controlling for attitudinal variables as the coefficient on the variable 'religion' becomes more robust in its size and significance level. This seems to suggest that there might be other variables that influence altruistic behaviours rather than religious beliefs.

Although psychologists exhibit higher environmental morale then economists, there is no significant difference between their levels of voluntary contribution to recycling. At first glance this seems surprising, however, it might be argued that the apparent contradiction offer insights into the occurrence of the Andreoni's crowding-out effect. In particular, the hypothetical VOLUNTARY scenario conforms more to the current situation of Italian respondents living in Florence than that of British students living in Bath. Therefore, when pooling together all data from psychologists and economists the negative effect of removing the actual incentives in Bath (e.g. kerbside collection, and the provision of bins and bags for recycling) is translated into a reluctance towards recycling for those who are already enjoying a *facilitating* policy. The lesson to be drawn from this is that recycling behaviours seems to be *reversible* and that governments should be cautious in experimenting with market solutions when (social) norms have not been internalized.

Additionally, results indicate that Europeans living in UK have a lower environmental morale compared to others and therefore they are also more reluctant to contribute voluntarily to recycling activities. This result (in addition to those above described) provides evidence in favour of the hypothesis that individuals' willingness to protect the environment depends on the level of their initial environmental morale. In addition, given that the majority of individuals interviewed in UK are British, results suggest that the British are less compliant than other Europeans. In order to capture

the effect of nationality on the willingness to contribute to recycling activities, two additional regressions were run only including the European sample of respondents where two dummy variables for Italians and British replaced the dummy 'European' in Table 4. Results are reported in Tables 6.[24] Results show that there is a positive relationship between voluntary contribution to recycling activities and the dummy variable 'Italians' (at the 10% significance level), while the British seem to contribute less than other Europeans (at the 5% significance level). At first glance this appears surprising since as noted above the British perform better than Italians in terms of material recycled (excluding other forms of recycling such as composting). However, rather than a discrepancy between actual and self-reporting behaviours, this can be a consequence of the geographical area in which respondents were interviewed. According to the ISTAT's report (2011), in fact, the amount of sorted and collected waste in Florence reached 38.4 percent in 2010, a value that is a long way away from the average percentage value registered in the central of Italy (i.e. 28 per cent). Therefore in Florence respondents might be more open to recycling activities than in other areas of the central of Italy. This also seems to explain why there is not a significant difference in the level of environmental morale among the two groups based on national identity, although the sign of the estimated coefficients of both dummy variables 'Italians' and 'British' are consistent with those of voluntary contribution. All other coefficients seem to confirm the results discussed above.

[Insert Table 6 about here]

In order to capture individuals' responses to policy changes the ranking of answers to the BIN and FINE scenarios were regressed on all socio-economic/demographic and attitudinal variables using multinomial regression analyses. The main results are shown in short in Figures 2 and 3.[25] Each row of the figures represents the effect of the independent variables on the log odds ratio (reported on the top of horizontal axis) of each outcome versus the base category. If a number is to the right of another number, a marginal change in the independent variable make the outcome to the right more likely to occur (see Long and Freese, 2006). The distance between a pair of numbers indicates the magnitude of the effect. A line drawn between two outcomes adds significance levels. Therefore outcomes that are tied together do not reflect a significant effect. Outcomes refer to alternative answers to the BIN and FINE scenarios, where outcome 1 (base outcome)= 'I would exert the same level of effort', and outcomes 2/3 = 'I would increase/decrease my effort'.

As can be seen from Figure 2 (below), in the BIN scenario the impact of the attitudinal variables 'altruism' and 'social responsibility' is minimal and never significant. However, rational trust in government seems to play a role for the willingness to change the provision of effort since the space between outcomes 1 and 2 is significant, meaning that an increase in the level of trust makes it more likely that respondents will increase their level of effort relative to the base outcome. In contrast, as it is evident in the FINE scenario (see Figure 3 below) the distance between the three outcomes for each of the attitudinal variable is not evenly spaced.

[24] The table considers only regression results generated by including all variables of the model given that separate regressions with socio-economic/demographic and attitudinal variables did not added much in terms of the significance level of the estimated coefficients.
[25] Full regression results are available from the author on request.

Figure 2: Odds ratio plot of change in effort relative to category 1(BIN)

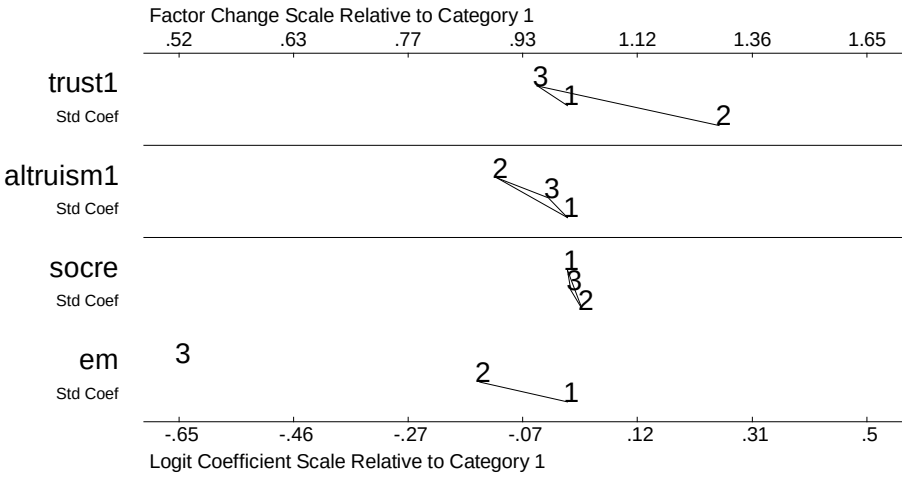
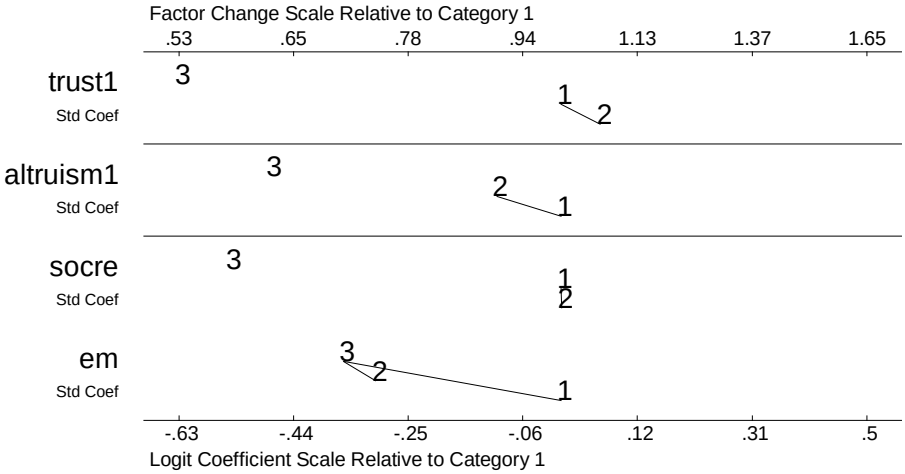


Figure 3: Odds ratio plot of change in effort relative to category 1(FINE)



Note: trust1, altruism1, socre and em in both figures denote respectively the variables 'trust in government', 'altruism', 'social responsibility', and 'environmental morale'. Results are based on the full sample.

In particular, the space 2-1 seems to be equally large and smaller than that between the other two outcomes. This signals that the impact of attitudinal variables play an important role in determining a respondent's willingness to choose outcome 2 or 1 rather than outcome 3.

Furthermore, regarding the effect of environmental morale, two aspects need to be emphasized. First, the ordering of the three outcomes indicates that high environmental morale makes it more likely for a respondent to choose outcome 1 instead of the other two outcomes. Therefore, although the extent of individual's reactions to policy measures depends upon their initial level of environment morale, the effect seems to be neutral for those who initially exhibit high environmental morale (for similar conclusions see Grepperud, 2007). Among other reasons, a possible explanation for this is that, given their higher initial level of environmental morale, individuals are indifferent to changes in policy measures to enforce recycling behaviours (Feldman and Perez, *forthcoming*). Second, as outcomes 2 and 1 are closer than outcomes 3 and 1 (although the distance is not always significant), this indicates that the odds of choosing 2 vs 1 cannot be improved upon substantially (especially in the BIN scenario) by increasing the level of environmental morale. Trust in government, therefore, seems to be much more important than environmental morale for the choice of outcome 2 vs 1.

5. Conclusions

Recent theoretical and empirical analysis (see for example Bruvoll et al., 2002, and Grepperud, 2007) attempting to analyse the determinants and the variation in environmental and recycling behaviours in response to different policy schemes recognise the importance of intrinsic motivation as a possible explanation. This analysis helps an understanding of what shapes environmental morale and provides further evidence on the influence of monetary incentives on individuals' environmental morale.

In line with predictions, environmental morale seems to be driven by feelings of altruism, needs to conform to norms and reciprocal preferences. The description of the follow-up responses and empirical findings described in previous sections seem to support this conclusion.

The differences between the levels and the reasons for respondents' reactions lend support to the hypothesis that individuals react to government's policies according to the nature of the signals. A fair policy (e.g. *facilitating* nudge) may increase effort provision via a disciplining effect and a crowding-in effect of intrinsic motivation.

In contrast, an unfair policy (e.g. enforcing State intervention) increases the provision of effort via a disciplining effect and reduces the provision of effort via a crowding-out effect on intrinsic motivation. As the crowding-in effect of intrinsic motivation is stronger in the BIN scenario and the crowding-out effect of intrinsic motivation dominates in the FINE scenario it might be inferred that respondents perceived facilitating *nudge* policy measures as more desirable than a mandatory scheme. This result has important consequences from a policy perspective and it is in line with the ongoing debate over the voluntary/mandatory nature of recycling schemes. On the one hand, mandatory schemes might serve as a deterrent to not recycling. On the other

hand, sceptics argue that mandatory measures may create feelings of pressure (by forcing people to comply) and may result in other irresponsible behaviours (e.g. fly tipping), and further that they do not serve as instruments to acknowledge the importance of environment. This raises two additional questions: 1) what would be the consequence of removing the external regulation when, e.g., international commitments have been realized? 2) How to motivate people to value non-interesting and external motivated activities in order to promote autonomous regulation instead? These considerations seem also to be supported by findings in the empirical analysis in which respondents in the UK seem to be reluctant to see a removal of the existing monetary incentives. From a policy perspective, this suggests that a fair policy measure might be more effective in generating a positive long-run effect as the introduction and subsequent removal of external intervention would not alter individuals' perception that recycling is the right thing to do. However, such a long-term effect requires not only different initial levels of environmental morale among individuals (as suggested by Rege, 2004), but also that the percentage of individuals that has internalized recycling as a social norm is sufficiently increased after the incentive removal. Note that the kerbside collection in the city of Bath dates from October 2010. This might explain respondents reactions reported above.

Consistent with findings reported by Feldman and Perez (forthcoming), results in this survey suggest that individuals' reactions to policy measures depends on their initial level of environmental morale and effects seem to be neutral for those who initially exhibit high environmental morale (as suggested by Grepperud, 2007). The results reported in this study also indicate that there is a difference in individuals' sensitiveness towards the environment. According to previous survey analyses and laboratory experiments (see for example Frank et al., 1993, Selten and Ockenfels, 1998, and Torgler et al., 2009), there is a strong effect of gender, with females showing greater environmental morale and willingness to voluntarily contribute to recycling activities. However, in contrast with the corruption literature (see for example Frank and Schulze, 2000) and the compliance literature (see for example Cullis et al., 2006 and Cullis et al., 2012) it is not possible to make strong conclusions about the impact of instrumental behaviour as a consequence of national identity (i.e. Italians vs British) and different education (i.e. psychologists vs economists).

This said, it is also important to acknowledge that the survey is based on students' responses and on hypothetical scenarios rather than on a representative sample of households and their actual behaviour. This might explain some of the weaknesses of the results found in this study with respect to the existing literature on individuals' attitudes towards the environment. In this sample e.g. there was not very much variation in the variables age, occupation, and marital status. The literature acknowledges also the importance of education as a possible explanatory variable, which was not included in this analysis. In further research it would be interesting to consider the relevance of these variables by analysing a broader socio-economic sample.

However, a growing experimental literature relies on students' responses and as suggested by Cullis et al. (2012, p. 167) 'there is no reason to believe that the cognitive processes of students are different from those of 'real' people'. Regarding the hypothetical bias of stated preferences methods it might be argued that this

problem seems to play a major role in fostering misleading conclusions for quantitative analyses rather than for qualitative ones. The purpose of this study was not to assess which is the best policy to adopt in order to encourage individuals to recycling activities among those mentioned in the hypothetical settings, but to shed light on how individuals react (in terms of intrinsic motivation) to different policy schemes (i.e. positive/negative signals). Thus, these aspects seem not to play a major role here. In addition, hypothetical scenarios served to reduce 'socially acceptable' responses bias (for a discussion see Orviska and Hudson, 2003). Furthermore, although it is important to recognize the relevance of these criticisms one should notice that the costs of extending the survey to a broader sample of respondents or to analyse these aspects in a 'real life' experiment would have been prohibitive.

The results here provides a contribution to that part of the literature that indicates that monetary incentives (i.e. taxes, subsidies and fines) can be counterproductive and undermine environmental morale as the intrinsic motivation to contribute to a better environment. A good understanding of what shapes environmental morale and its interaction with external regulation is relevant when designing policy measures to deter free-riding.

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Table 1: The interaction between intrinsic and extrinsic motivation and the relative change in efforts			
Change in effort, relative effects	**Disciplining effect**	**Crowdin-in effect**	**Crowding-out effect**
Bin Scenario			
Increase	Recycling will be less time and effort consuming	I am happy to spend more effort if recycling facilities increase (Frey's crowding-in effect)	-
Decrease	-	-	- Recycling (or not) should be an individual choice and not treated as an almost moral obligation (Frey's crowding-out effect) - I would put in less effort because I can achieve the same quantity of recycling as before given the improved recycling activities (Andreoni's crowding-out effect)
Fine Scenario			
Increase	I will increase my effort because I do not want to incur a fine	Given that now we all contribute at least a little, I would like to exert more effort than I believe others do to show that I care more about the environment (Frey's crowding-in effect)	-
Decrease	-	-	- Recycling (or not) should be an individual choice and not treated as an almost legal obligation (Frey's crowding-out effect) - I prefer to pay someone else to do my recycling (Andreoni's crowding-out effect)

Table 2. Description of the Variables

VARIABLE	DEFINITION	EARLIER STUDIES
Dependent variables		
Voluntary contribution	Ordinal variable that assumes values 1=I will do hardly any recycling	
Willingness to change effort (BIN scenario)	Categorical variable that assumes value 1=I would exert the same level of effort, 2/3=I would increase/decrease my effort	
Willingness to change effort (FINE scenario)	Same as above	
Independent variables		
Socio-economic demographic factors (SOCIODEM)		
Gender (+)	Dummy coded 1 if female and 0 if male	Torgler et al. (2008, 2009); Whitmarsh and O'Neill, 2010
Age (+/-)	Ordinal variable that assumes values 1(15-24) to 5(55-64)	Ewing, 2001; Barr, 2003; Torgler and García-Valiñas, 2007; Torgler et al., 2008
Working student (+)	Dummy coded 1if working student and 0 otherwise	Torgler and García-Valiñas, 2007; Torgler et al., 2008
Never married (+)	Dummy coded 1 if ever married and 0 otherwise	Torgler and García-Valiñas, 2007; Torgler et al., 2008
Financial satisfaction (+)	Ordinal variable that assumes values 1=extremely dissatisfied to 10=extremely satisfied	Domina and Koch, 2002; Torgler and García-Valiñas, 2007
Religion (+)	Ordinal variable that assumes values 1=not at all important to 5=very important	-
Italian (-)	Dummy coded 1 if Italian and o otherwise	-
British (+)	Dummy coded 1 if British and 0 otherwise	-
European (+/-)	Dummy coded 1 if European and 0 otherwise	-
Psychologists/Economists (+)	Dummy coded 1 if psychologist and 0 otherwise	-
Attitudinal factors (ATTITUDES)		
Risk (+/-)	Dummy coded 1 if risk averse and 0 otherwise	-
Trust in government (+)	Ordinal variable that assumes values 1=none at all to 5=a great deal	-
Social responsibility (+)	Continuous (Multi-item index)	-
Altruism (+)	Ordinal variable that assumes values 1=not at all important to 5=very important	-
Ethics (ETHICS)		
Environmental morale (+)	Continuous (Multi-item index)	-

Note: The table reports the variables included in the regression analysis, their expected signs and some earlier studies having used these variables.

Table 3: Individual attitudes towards recycling and change in policy measures			
Medium/High Voluntary Contribution		**Medium/Low Voluntary Contribution***	
Answers		*Answers*	
Awareness	71%	Lack of awareness	12% (21%)
Information	19%	Lack of information	30% (56%)
Conform to norms	9%	Conform to norms	14% (9%)
Other Reasons	1%	Other Reasons	44% (14%)
N. obs	681	*N. obs*	188 (86)
Increase effort in BIN scenario		**Decrease effort in BIN scenario**	
Answers		*Answers*	
Crowding-in effect	36%	Crowding-out (Andreoni, 1989)	67%
Disciplining effect	62%	Crowding-out (Frey, 1997)	33%
Conform to norms	2%	Conform to norms	0%
Other reasons	0%	Other Reasons	0%
N. obs	677	*N. obs*	43
Increase effort in FINE scenario		**Decrease effort in FINE scenario**	
Answers		*Answers*	
Crowding-in effect	17%	Crowding-out (Andreoni, 1989)	22%
Disciplining effect	80%	Crowding-out (Frey, 1997)	78%
Conform to norms	3%	Conform to norms	0%
Other reasons	1%	Other reasons	0%
N. obs	639	*N. obs*	32
Note: *percentage of answers of those who declared they would provide a medium level of effort in the VOLUNTARY scenario is reported in parentheses. The proportion of responses of each follow-up question is calculated according to the total number of observation related to each scenario. The table was built using the full sample.			

Table 4: Voluntary contribution (full model) – ordered probit results						
Voluntary Contribution (full model)						
Independent variables	**Ordered Probit robust**					
	Regression1		**Regression2**		**Regression3**	
Socio-economic demographic variables	**Coeff**	**Marg**	**Coeff**	**Marg**	**Coeff**	**Marg**
Gender	0.221***	0.028***	0.178**	0.022**	0.109	0.012
	(2.84)	(2.85)	(2.29)	(2.31)	(1.40)	(1.41)
Age	0.946*	0.126*	0.886*	0.112*	0.618	0.071
	(1.76)	(1.77)	(1.72)	(1.73)	(1.27)	(1.26)
Age2	-0.215*	-0.028*	-0.222*	-0.028*	-0.176	-0.020
	(-1.67)	(-1.68)	(-1.81)	(-1.81)	(-1.57)	(-1.56)
Working student	0.231*	0.035	0.149	0.020	0.154	0.019
	(1.65)	(1.44)	(1.04)	(0.95)	(1.03)	(0.92)
Never married	0.024	0.003	-0.069	-0.009	-0.239	-0.032
	(0.14)	(0.15)	(-0.39)	(-0.037)	(-1.33)	(-1.14)
Financial satisfaction (log)	-0.024	-0.003	-0.072	-0.009	-0.014	-0.001
	(-0.28)	(-0.28)	(-0.84)	(-0.84)	(-0.16)	(-0.16)
Religion	-0.003	-0.000	-0.040	-0.005	-0.021	-0.002
	(-0.11)	(-0.11)	(-1.36)	(-1.35)	(-0.71)	(-0.71)
European	-0.514***	-0.069***	-0.479***	-0.060***	-0.412***	-0.047***
	(-5.92)	(-5.28)	(-5.20)	(-4.69)	(-4.59)	(-4.10)
Psychologists/Economists	0.124	0.017	0.087	0.011	-0.026	-0.003
	(1.19)	(1.14)	(0.82)	(0.80)	(-0.25)	(-0.25)
Attitudinal variables						
Risk			0.145**	0.019*	0.145**	0.017*
			(1.96)	(1.87)	(1.96)	(1.86)
Trust in government			0.042	0.005	0.036	0.004
			(1.00)	(1.01)	(0.83)	(0.84)
Social responsibility			0.147***	0.018***	0.077	0.008
			(2.77)	(2.76)	(1.44)	(1.45)
Altruism			0.200***	0.025***	0.113**	0.013**
			(4.43)	(4.23)	(2.48)	(2.45)
Ethics						
Environmental morale					0.530***	0.061***
					(8.16)	(7.30)
N. obs	950		950		950	
Prob>chi2	0.000		0.000		0.000	
Pseudo R2	0.025		0.041		0.072	

Note: Marginal effect are estimated for the highest willingness to voluntarily contribute to recycling activities (i.e. outcome 5). *, **, ***, denote significance level at 10%, 5%, and 1% respectively. Robust standard errors. (.) denotes z-score. The table includes the Prob>chi2 and the Pseudo R2 for the fitted model. The dummy variable 'European' (coded 1 for Europeans living in UK and 0 otherwise) has been added in the estimations to control for differences in the place of data collection.

Table 5: Environmental morale – Ordinary least square (OLS) results		
Environmental Morale (full model)		
Independent variables	**OLS robust**	
	Regression1	**Regression2**
Socio-economic demographic variables	**Coeff**	**Coeff**
Intercept	2.211***	1.249***
	(6.08)	(3.56)
Gender	0.190***	0.148***
	(4.07)	(3.28)
Age	0.756*	0.666**
	(1.86)	(1.90)
Age2	-0.135	-1.129
	(-1.39)	(-1.55)
Working student	0.069	0.002
	(0.77)	(0.03)
Never married	0.413***	0.311****
	(3.28)	(2.80)
Financial satisfaction (log)	-0.072	-0.114**
	(-1.35)	(-2.46)
Religion	-0.006	-0.038**
	(-0.38)	(-2.27)
European	-0.211***	-0.171***
	(-4.28)	(-3.32)
Psychologists/Economists	0.273***	0.225***
	(4.76)	(4.00)
Attitudinal variables		
Risk		0.014
		(0.33)
Trust in government		0.018
		(0.77)
Social responsibility		0.149***
		(3.98)
Altruism		0.182***
		(7.88)
N. obs	951	950
Prob>F	0.000	0.000
R2	0.094	0.187

Note: *, **, ***, denote significance level at 10%, 5%, and 1% respectively. Robust standard errors. (.) denotes t-statistics. The table includes the Prob>F-statistics and the R2 for the fitted model. The dummy variable 'European' (coded 1 for Europeans living in UK and 0 otherwise) has been added in the estimations to control for differences in the place of data collection.

Table 6: Voluntary contribution (effect of nationality) – ordered probit results			
Voluntary Contribution			**Environmental Morale**
Independent variables	**Ordered Probit robust**		**OLS robust**
Socio-economic demographic variables	**Coeff**	**Marg**	**Coeff**
Intercept	-	-	1.285***
			(3.76)
Gender	0.177**	0.019**	0.128***
	(2.07)	(2.06)	(2.70)
Age	0.852	0.093	0.463
	(1.28)	(1.28)	(1.47)
Age2	-0.227	-0.025	-0.065
	(-1.33)	(-1.33)	(-0.89)
Working student	0.135	0.016	0.004
	(0.87)	(0.76)	(0.05)
Never married	0.135	-0.011	0.290**
	(0.87)	(-0.49)	(2.54)
Financial satisfaction (log)	-0.031	-0.003	-0.157***
	(-0.34)	(-0.34)	(-3.36)
Religion	0.000	0.000	-0.047***
	(0.01)	(0.01)	(-2.64)
Italians	0.262*	0.029	0.009
	(1.73)	(1.64)	(0.12)
British	-0.309**	-0.034**	-0.112
	(-2.32)	(-2.24)	(-1.59)
Psychologists/Economists	-0.055	-0.005	0.204***
	(-0.52)	(-0.53)	(3.49)
Attitudinal variables			
Risk	0.077	0.008	-0.003
	(0.95)	(0.93)	(-0.08)
Trust in government	0.096**	0.010**	-0.015
	(1.97)	(1.96)	(-0.62)
Social responsibility	-0.016	-0.001	0.225***
	(-0.26)	(-0.26)	(5.50)
Altruism	0.094*	0.010*	0.168***
	(1.95)	(1.95)	(6.90)
Ethics			
Environmental morale	0.514***	0.056***	-
	(7.19)	(6.50)	
N. obs	830		829
Prob>chi2/Prob>F	0.000		0.000
Pseudo R^2/ R^2	0.073		0.210

Note: Marginal effect are estimated for the highest willingness to voluntarily contribute to recycling activities (i.e. outcome 5). *, **, ***, denote significance level at 10%, 5%, and 1% respectively. Robust standard errors. (.) denotes z-scores and t-statistics respectively for the ordered probit and OLS models. The table includes the Prob>chi2/Prob>F and the Pseudo R^2/R^2 for the fitted model.

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Appendix A: Questionnaire

University of Bath
Attitudes to Recycling

Questionnaire

There are many reasons why governments are promoting recycling activities. In particular, they are aimed at reducing: waste to landfill; excessive consumption of raw materials; methane emissions; water contamination; and odours and noise pollution.

The purpose of this questionnaire is to gather information on people's attitudes towards recycling activities. The questionnaire is divided into three different sections. In "SECTION 1" you are requested to answer questions about hypothetical scenarios regarding recycling activities. Each setting varies according to different policies introduced by the local authority, which is officially responsible for the provision of public services in your area. Remember these are imaginary situations that do not have to be necessarily related to your actual personal experience. In "SECTION 2" and "SECTION 3" you are asked to provide general information about yourself and to state your opinion on particular issues.

To answer the questions, please tick ONE of the boxes next to the answer(s); or, when appropriate, write your answer in the space provided. Unless the question allows you to tick more than one answer, please just tick one box per question.

I would be very grateful for your contribution to this study. All responses will remain anonymous. Thank you for your help.

SECTION 1: Hypothetical scenarios

Q1 – Suppose you have to bear the time and trouble costs of recycling activities (i.e. separate your waste and bring it to the closest recycling centre; buy biodegradable garbage bags and different bins for specific waste; etc.). How would you define your level of contribution in terms of effort spent on recycling activities?

Very high..... **(Go to Q1.a below)**.....□
High..... **(Go to Q1.a below)**.....□

Medium **(Please select ONLY ONE option among the possible alternatives presented in Q1.a or Q1.b below to explain your position)** ☐
Low **(Go to Q1.b below)** ☐
I will do hardly any recycling **(Go to Q1.b below)** ☐

Q1.a – Please, indicate which of the following reasons was the most important for your decision:

I believe environmental damages caused by not recycling are significant ☐
I am well informed about waste recycling collections ☐
I participate in recycling activities because others do so ☐
Other reasons (**please write in**):

.....
.....
.....

Q1.b – Please, indicate which of the following reasons was the most important for your decision:

I believe environmental damages caused by not recycling are insignificant ☐
I am not well informed about waste recycling collections ☐
I do not participate in recycling activities because others do not ☐
Other reasons (**please write in**):

.....
.....
.....

Q2 - Suppose that in order to improve recycling activities the local authority decides to provide recycling materials (e.g. containers for waste and recyclables; liners; etc.) and to improve collection services (e.g. provision of convenient collection pavement points and/or increase the number of drop-off sites for recyclables; and for those with convenient collection points, increase the range of material collected; etc.). For this you will not be charged any fee.

Given your answer in <u>QUESTION Q1</u>, how do you think this will affect your behaviour?

I would exert the same level of effort **(Go to Q3 below)** ☐
I would increase my effort **(Go to Q2.a below)** ☐
I would decrease my effort **(Go to Q2.b below)** ☐

Q2.a – Please, indicate which of the following reasons was the most important for your decision:

I am happy to spend more effort if recycling facilities increase ☐
Recycling will be less time and effort consuming ☐
I believe others will do so ☐

Other reasons (**please write in**):

.....

.....

.....

Q2.b - Please, indicate which of the following reasons was the most important for your decision:

I would put in less effort because I can achieve the same quantity of recycling as before given the improved recycling activities ☐
Recycling (or not) should be an individual choice and not treated as an almost moral obligation ☐
I believe others will do so ☐
Other reasons (**please write in**):

.....

.....

.....

Q3 – Suppose now, in addition to the provision of recycling materials and the improvement of collection services, the local authority will introduce a money fine on those that do not recycle as requested. The money collected will be used to pay a company that manages to make use of the unsorted waste collected from your home. The environmental effect will be the same as if you did it by yourself. The money fine is set at the local littering fine if you are found to be not recycling.

Given your answer in <u>QUESTION Q1</u>, how do you think this will affect your behaviour?

I would exert the same level of effort **(Go to Q4 below)** ☐
I would increase my effort **(Go to Q3.a below)** ☐
I would decrease my effort **(Go to Q3.b below)** ☐

Q3.a - Please, indicate which of the following reasons was the most important for your decision:

I will increase my efforts because I do not want to incur a fine ☐
Given that now we all contribute at least a little, I would like to exert more effort than others to show that I care more about the environment ☐
I believe others will do so ☐
Other reasons (**please write in**):

.....

.....

.....

Q3.b - Please, indicate which of the following reasons was the most important for your decision:

I prefer to pay someone else for doing my recycling ☐
Recycling (or not) should be an individual choice and not treated as an almost legal obligation ☐
I believe others will do so ☐
Other reasons (**please write in**):

.....
.....
.....

SECTION 2: About you

Q4 – Gender:

Male ☐
Female ☐

Q5 – Age:

15 - 24 ☐
25 – 34 ☐
35 – 44 ☐
45 – 54 ☐
55 – 64 ☐
65 + years ☐

Q6 – Nationality:

British ☐
Italian ☐
Other European ☐
African ☐
American ☐
Asian ☐
Australian ☐
Middle Eastern ☐
Pacific Islander ☐

Q7 - Marital status:

Married ☐
Live as a couple ☐
Divorced ☐
Separated ☐
Widowed ☐
Single ☐

Q8 – On a scale of 1 to 10, how would you define your financial satisfaction? Where 10 is extremely satisfied and 1 is extremely dissatisfied.

1	2	3	4	5	6	7	8	9	10

Q9 – Occupation:

Self – employed ☐
Part - time employed ☐
Full – time employed ☐
Unemployed ☐
At home ☐
Student ☐
Retired ☐
Other (Please state) ☐

SECTION 3: General information

Q10 - Which of the following attributes would be most important for you about a job? Rank 1 to 5 each option below, with 1 = very important, 2 = important, 3 = moderately important, 4 = of little importance, 5 = unimportant.

A good income ☐
A safe job with no risk ☐
Working with people you like ☐
Doing an important job ☐
Doing something for community ☐

Q11 - How important is religion in your life?

Very important ☐
Important ☐
Rather important ☐
Not very important ☐
Not at all important ☐

Q12 – What is the level of confidence you have in governments?

A great deal ☐
Quite a lot ☐
A moderate amount ☐
Not very much ☐
None at all ☐

Q13 – How important is "service to others" in your life?

Very important ☐
Important ☐
Rather important ☐
Not very important ☐
Not at all important ☐

Q14 – How would you consider the following statements?

a) Cheating on taxes:

Never justified ☐
Rarely justified ☐
Sometimes justified ☐
Often justified ☐
Always justified ☐

b) Throwing away litter in a public place:

Never justified ☐
Rarely justified ☐
Sometimes justified ☐
Often justified ☐
Always justified ☐

c) Avoiding a fare on public transport:

Never justified ☐
Rarely justified ☐
Sometimes justified ☐
Often justified ☐
Always justified ☐

d) Smoking in a public place:

Never justified ☐
Rarely justified ☐
Sometimes justified ☐
Often justified ☐
Always justified ☐

Q15 - Suppose you have two identical 'supermarket' type goods: one is environmentally - friendly, the other one is a conventional product. Compared to the price of the conventional good, what price would you be willing to pay to buy the environmentally-friendly item? The difference in price helps to protect the environment.

Only the same price as the conventional good ☐
10 % more than the price of the conventional good ☐
20 % more than the price of the conventional good ☐
30 % more than the price of the conventional good ☐
More than 30% than the price of the conventional good ☐

Q16 - Please indicate how often you take each action for environmental reasons:

a) Save water when taking a shower or brushing your teeth:

Never ☐
Rarely ☐
Sometimes ☐
Often ☐
Always ☐

b) Recycle:

Never ☐
Rarely ☐
Sometimes ☐
Often ☐
Always ☐

c) Turn off lights you are not using:

Never ☐
Rarely ☐
Sometimes ☐
Often ☐
Always ☐

d) Walk, cycle or take public transport:

Never ☐
Rarely ☐
Sometimes ☐
Often ☐
Always ☐

Thank for taking the time to complete this questionnaire!